M08a **Links between Sunspot Oscillations and Magnetic Helicity in the Solar Atmosphere**

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The recent SDO/AIA/HMI multi-wavelength data with high cadence and high spatial resolution enable us to study in detail the phenomenon of sunspot oscillation, and detect swirls in rotating structures. Given the temperature-wavelength range we resolve not only horizontal but also vertical structures of slow magneto-acoustic wave fronts. We use the PWF (Pixelized Wavelet Filtration) method (Sych et al., 2008) to extract the narrowband frequency structure of swirl-like waveguides inside sunspots. By using the Local Correlation Tracking (LCT) technique we compute the phase velocities of magneto-acoustic waves at several levels in and above the photosphere and quantify its swirling dynamics. By superposing various multi-wavelength data we analyse vertical structure of the swirl above the sunspot. We can see how helical structures expand from the solar photosphere into the chromosphere and up to the corona. We use the SDO/HMI vector magnetogram data to track the electric current helicity simultaneously with the sound wave structures. For the case of NOAA 11131 (2010/12/08) we show close similarity of the helical properties of phase velocities of slow sound waves with helicity of magnetic field in the photosphere. Helicity injection from the solar convective zone through the photosphere and chromosphere into the corona is important for understanding the space weather as well as construction of models for the solar dynamo.